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Besides these astronomical instruments, there is placed on the parapet an efficient form of Campbell's globular lens for measuring and recording the duration, and to a considerable extent the comparative intensity, of sunshine during each day. This (to me, at least) interesting instrument I have covered with a thin cylindrical glass shade; and close to it is a radiation thermometer with a blackened bulb in vacuo. The instrument, *in this protected form of it*, is, I believe, a novelty not without its value; and hitherto its action has been admirable, inasmuch as it is very easy to read at a glance the duration of even any fitful sunshine during a succession of showers, within intervals of three or four minutes of time. By the side of it I have placed a Sun Spectroscope, for the observing of the "*Rain Bands*," together with a new and effective form of Daniells's hygrometer, designed by Mr. Bouillard, for comparison with the spectroscope in the forecasting of rain. Up to the present time the indications have been much to the advantage of the spectroscope. I can hardly doubt that these details of attempts to excite at least the curiosity of a large and important class of University students in subjects more or less astronomical, together with the account of the proceedings of our new Astronomical Institution at Oxford, will not be without their interest to many members of the Society.

I will only add that the Board of Visitors, at the head of which is the Vice-Chancellor, have sent in a recommendation to the University Commission for the furnishing of such funds and instruments as are necessary for the efficient maintenance of the Observatory. They also recommend the founding of a few astronomical studentships for the encouragement of the study of our science.

Oxford University Observatory,
Nov. 1878.

On the Spectrum of the New Star in Cygnus.

By T. W. Backhouse, Esq.

Soon after the appearance of the new star in *Cygnus*, and at various times since, I made observations on its spectrum with one of Browning's miniature spectroscopes on a Cooke's refractor of 4¼ inches aperture. With such small instruments accurate measurements have not been possible; and those I made must be taken for what they are worth.

I compared the spectrum of the star with those of vacuum tubes, of sparks in air, and of a Bunsen's burner; and from these observations I have calculated the positions of the bright lines on Huggins' scale. These are shown in Table I.; and the weight I attach to each observation is also given.

In Table II., Column A, these positions are reduced to wavelengths. My drawings of the spectrum show that these results cannot be all correct, and in Column B are given what I judge therefrom to be more accurate positions, and also those of two

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lines that I only suspected. Column C gives Cornu's positions of the lines,* so far as they can be identified with mine; Column D gives Dr. Vogel's;† Column E, Dr. Copeland's, Jan. 1877;‡ and Column F, Lord Lindsay's, Sept. 1877. In Vogel's drawing of Dec. 8, 1876, all my lines are shown, except κ, besides a large number of others. The chief differences between my drawings and his of corresponding periods are the brightness in mine of δ and β and the feebleness of the diffused light next α towards β. Copeland's 456 and 414 are not certainly identified with mine.

Table III. gives the estimated relative brightness of the lines, that of γ being throughout taken as 1. A line given as ·5 is therefore one which I estimate to be half the brightness of γ, approximately. A query signifies a line merely suspected.

On July 24, 1877, γ was the only line visible, but there was much moonlight. On Aug. 8 I was almost sure of the existence of one line less refrangible than γ, and suspected another. On Nov 6 γ was the only line; but on the 29th I again suspected a line or two towards the red. On Dec. 7 γ was the only line.

I will add the following notes on the continuous spectrum.

1876, Dec. 28. Brightest from α to ϵ, especially about β and from γ to ϵ; also for a short distance after ζ, and again before η.

1877. On Feb. 12 I remarked that it had throughout remained brightest in much the same region, but that it was perhaps a little fainter in comparison with the bright lines.

March 14. Continuous spectrum very slight; it lies mostly on the least refrangible side of γ.

Aug. 8 and Nov. 6. A portion still suspected on the red side of γ.

Nov. 29 and Dec. 7. A portion suspected on each side of γ.

As the latter observations were made with the slit open to its widest extent, it is quite possible that some minute star may have been included in the field and so caused a continuous spectrum. It is undoubtedly the case that almost the whole of the light of the new star was then contained in the one bright line γ.

On February 2, 1878, I observed the spectrum by the method of simply placing a prism in front of the eye-piece of the telescope, when it appeared exactly like a star without the prism.

When I last looked for the star, on May 17, I found it was still fading, it being not certainly visible in the telescope; there were, however, both moonlight and twilight.

It must be understood that, though throughout this paper I have spoken of bright "lines" in the spectrum, they really appeared as points with my method of observing them—focusing the star on the spectroscope.

As regards the colour of the star, on December 22, 1876, it appeared white, but the observation was not favourably made. From December 27 to January 8 it was orange, at one time a deeper colour than 75 *Cygni*. On January 20 it appeared yellowish, but was getting too faint for its colour to be well distinguished.

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* *Nature*, vol. xv., p. 158.

† *Ibid*, vol. xvi., p. 400.

‡ *Ibid*, vol. xvi., p. 401.

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TABLE I.—*Positions of the Bright Lines on Huggins' Scale.*

	α	Weig.	β	Weight.	θ	Weight.	γ	Weight.	δ	Weight.	ϵ	Weight.	ζ	Weight.	η	Weight.
1876. Dec. 28	1005	5	1430	5			1750	10	1900	10	2050	10	2450	10	3370	5
,,	1060	5	1550	5	1710	5	1940	5	2085	5	2230	5	2640	5		
,,	1015	15	1550	15	1710	15	1950	15	2105	15	2260	15	2660	15		
1877. Jan. 8							1820	15			2075	15	2520	15		
19							2060	3								
20							2060	25			2325	25				
,,							1880	10								
25							1855	12								
Feb. 12	1140	8					1980	5			2165	6	2415	5	3425	5
,,							1940	10			2155	6	2595	10		
Mar. 14							2015	12								
,,							1995	12								
,							2015	8								
,,	930	3														
15	1210	2														
,,	1045	5					1885	8								
,,							1765	8								
,,							1911	15								
May 15							1937	15								
,,							2015	10								
July 24							1934	20								
Dec. 7							1967	20								
Average	1049	43	1526	25	1710	20	1937	238	2033	30	2204	82	2557	60	3397	10

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Table II.

Wave-lengths of the Bright Lines.

Line.	A. By comparison with other spectra. Backhouse.	B. By drawings. Backhouse.	C. Cornu.	D. Vogel.	E. Copeland.	F. Lindsay.
α	5831	5831	δ, 588	580		
? ι		? 5630				
β	5333	5315	γ, 531	527		
θ	5183	5210	β, 517	514		
γ	5022	5022	ζ, 500	499	504	4986
δ	4960	4943				
ε	4858	4858	η, 483	Hβ, (486)	486	
ζ	4679	4660		467	? 456	
? κ		? 4590				
η	4367	4367	ε, 435	Hγ, (434)	? 414	

Table III.

Relative Brightness of the Lines.

	1876.			1877.							
Line.	Dec. 27.	Dec. 28.	Dec. 30.	Jan. 2.	Jan. 8.	Jan. 17.	Jan. 19.	Feb. 7.	Feb. 14.	Mar. 14.	May 15.
α	·8	1·0	·8–	·45	·2	·17	·15	·12	? ·1	·15	·1
? ι		? ·1					? ·02				
β	1·0	1·0	·8–	·4	·2	·15	·1	·12	? ·1	·05	
θ		·5		·5							
γ	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0
δ	1·3	1·0	·8–	·6			? ·02				
ε	2·5	2·0	2·0	1·7	·5	·6	·5	·3	·25	·25	·08
ζ	·8	·5	·8	·45	·2	·2	·17	·15	·15	·15	·06
? κ		? ·1					? ·02				
η	·2	·1		·25			·02	·08	? ·1	·05	

Sunderland, June 3, 1870.